Consumption
Marasmus
Inflammation
Influenza

An Inaugural Thesis

on

Phthisis Pulmonalis

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"Scribimus docti indoctique"

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The pathology of the lungs is rendered an interesting object of inquiry not only by the immediate importance of this viscus to the continuation of life, but likewise by the obstinate and frequently irremediable diseases to which it is exposed. One of the most formidable instances of the ravages of disease upon this organ and on the system at large is presented in pulmonary consumption. The consideration of this disease, particularly with a view to the state of the *pulmonary veſsels*, as far as they are concerned in or connected with ~~this~~ it, constitutes the object of the following remarks. Should they be so unfortunate, as to shed no light on the subject, they will at least be attended with the consolatory reflexion of participating a common oblivion with many theories of much more respectable origin. —

The sanguiferous system may be considered as forming a circle, of which the Aorta & its branches constitute the larger portion, while the remainder is formed by the pulmonary vessels. Thro each of these parts the whole volume of blood is alternately propelled, & the same particles which at one moment are floating in the extremities, at another are presented for oxygenation in the arteries of the lungs.

That a perfect consent & balance between the pulmonary & aortic systems is indispensible to a free circulation, & of course to a healthy condition of the body, will readily be seen. It will also be obvious that the lungs differ from all the other viscera in this particular, that while the rest of the viscera are supplied with a comparatively small quantity of blood, which may in a great degree be conveyed by other channels; the lungs, whether healthy or diseased, whether free or obstructed, must always transmit in a given time the whole blood of the system

The causes of pulmonary consumption may be considered as of two kinds. First, those, which act primarily on the lungs, such as mal-conformation of the chest, catarrh, pneumonia,

hemoptysis, asthma, hydrothorax & all irritations or injuries of the lungs whether chemical or mechanical. Secondly, those which act primarily on the system, such as inanition, obstructed evacuations, repelled eruptions, scrophula, fevers, debilitating paſsions &c. &c. The most important of these as connected with the state of the pulmonary veſsels will be considered in their order.

I. Malconformation of the chest generally produced by a curvature of the spine forward with narrowneſs of the shoulders, is unquestionably a remote cause of phthisis. (~~Yet a late writer on phthisis (Dr Sanders) denies that.~~). In this case the lungs with the pulmonary veſsels are reduced and compreſsed in their size, they transmit with difficulty the imperfectly oxygenated blood, and are in continual danger of inflammation & its consequences. Yet a late writer on phthisis, Dr Sanders, denies that the form of the chest has any thing to do with phthisis. "If" says he "the lungs be adapted to the cavities which contain them, how is it poſsible that they should suffer injury from the peculiar dimensions of those cavities?" From this remark one would suppose that the writer considered the lungs as a mere inert maſs, whose

comparative size as little affected the general health, as that of the nose or foot. It is true that the lungs must adapt themselves to the cavities which confine them; but if these cavities be diminished & distorted from their natural size, if the organ of oxygenation be pent up in a sphere too narrow for the free exercise of its functions, will not the circulation of the pulmonary veſsels, which whether large or small must transmit the whole blood of the system, will not the circulation of these veſsels become forced and oppreſsed? and will not this oppreſsion & violence endanger disease of the lungs? If *water* be compelled to flow in a circle, its impetus & attrition will be greatest at that point where its channel is most narrow. Precisely so in the grand circle of the system, where the blood is impelled in one perpetual round; if the veſsels of the lungs constituting a part of this circle be oppreſsed in their situation & diminished in their calibers, is it poſsible that the circulation should proceed in that moderate & equable measure which attends the perfection of health? Surely not. The accumulated blood will be driven with augmented violence thro the gorged and

distended veſsels. The momentum of the fluids and resistance of the solids will be increased. A state of debility will succeed to this commotion and to the deficient oxygenation of the blood, requiring but a slight exciting cause to produce the bursting of arteries, the formation of tubercles & the other phenomena which attend or follow the disease.

II. In catarrh & pneumonia, which so frequently precede phthisis, an increased action of the pulmonary veſsels takes place, accompanied with an increased action of the veſsels of the whole system. The commotion, however, produced in the arteries of the lungs neceſsarily exceeds that in other parts of the body, so far, as to constitute this viscus the more immediate seat of the disease. The chance for pneumony or catarrh to terminate in phthisis seems to depend on the degree of previous debility, on the pulmonary predisposition, & on the proportion which the lungs with their veſsels bear to the rest of the body in size and capacity.

III. Hemoptysis when productive of phthisis, occupies an intermediate grade between cause & effect; since for its own production it requires some of the remote or exciting causes of phthisis. In this disease a disproportion neceſsarily exists

between the strength of the pulmonary veſsels and the impetus of the blood transmitted by them. Either an increased action, or a preternatural weakneſs, or smallneſs of these veſsels may produce hemoptysis.

IV. I am led to consider hydrothorax a cause of pulmonary consumption from having witneſsed one case in which symptoms of phthisis supervened to those of dropsy of the chest; and likewise, from having attended dissections, where water in the chest was accompanied with tubercles in the lungs. Here is a satisfactory instance in which a compreſsion of the pulmonary vessels takes place, ~~(Altho the the lung attended)~~ followed by increased force in the blood; for altho the lungs be collapsed & diminished by external pressure to half their size, still the same quantity of blood is forced into them from the right ventricle of the heart; so that a mechanical engorgement & distention takes place from the size and capacity of the lungs, independent of that from an increased action of the veſsels. It must not be forgotten that in this disease, as well as in malconformation of the chest, the bronchia are prevented from expanding so as to admit a sufficient quantity of air for the perfect oxygenation of the blood; a circumstance which tends strongly to

produce that degree of predisposing debility which always precedes consumption of the lungs

V. Original injuries of the substance of the lungs whether chemical or mechanical, tend to produce speedy inflammation of that organ, or else to debilitate the system by cough or by hemorrhage. The celebrated Pelletier died with phthisis induced by inhaling the fumes of oxy-muriatic acid gas. Those persons whose occupation exposes them to the inhalation of foreign substances, are peculiarly liable to the disease. Metallic dust & spiculæ tend seemingly to produce it more than other substances. According to Dr Reid, the ~~persons~~ mechanics employed in a proceſs of the manufactory of needles termed dry grinding, almost always die with phthisis. Dr Haighton produced a genuine tubercular phthisis in a dog by injecting mercury into the crural vein. In this experiment the metal must have been carried on with the blood until it was arrested by the minute branches of the pulmonary veſsels, since small globules of mercury were found in all the tubercles. A similar experiment was afterwards made by Dr Beddoes with the same result.

VI. A variety of remote causes, which seemingly have no immediate connexion with the lungs, by producing general debility, predispose to pulmonary consumption. Such are exceſsive evacuations, repelled eruptions, ſuppreſsed evacuations &c.&c. Scrophula has been supposed to bear some specific relation to phthisis. It is easy to concieve that similar causes should generate both diseases, or that the debility induced by the one should very often produce the other, & this without any peculiar or specific relation between them. Tubercles are not, as has been supposed, lymphatic glands, in a state of disease, since the lungs are nearly if not wholly destitute of glands of this description. The reason why general debility from the causes which have been mentioned is so frequently followed by pulmonary consumption, I conceive to be the previous existence of the pulmonary predisposition and the comparative weakneſs of the pulmonary vessels. That these veſsels are the weakest part of the sanguiferous system may be inferred from two circumstances, 1. The frequency of spontaneous hemorrhages from them, and 2dly, That while the other veſsels of the system are buried among muscles & cellular

substance, deriving from them support and defence; the veſsels of the lungs are situated in immediate contiguity with the open surfaces of the bronchiæ, from which they are so thinly separated that the chemical proceſs of oxygenation is constantly carried on between the two cavities thro the intervening partition

+The period, in which the greatest number of cases is said to occur, is from the eighteenth to the thirty sixth year. Among the causes, which tend to produce the disease at this time, the state of the thorax & lungs in comparison with their state at other periods of life, is perhaps not the least. In infancy the trunk bears a larger proportion to the extremities, the thorax is well formed & free from distortion, so that the capacity of the pulmonary veſsels is fully proportionate to the rest of the sanguiferous system. Besides this, the Thymus gland, ~~a body to which~~ exists of considerable size in early life, but is nearly obliterated in the adult. To this body no more rational or probable use can be aſsigned, than that of acting as a reservoir for the exceſs of blood sent toward the lungs. The preservation of infancy and childhood from more

frequent attacks of pulmonary diseases, particularly of phthisis, may in a great measure be owing to the existence of this viscus, whose functions have been so imperfectly understood, before the explanation of its use taught in this university. — The comparative unfrequency of phthisis in advanced life, may be in part attributed to the greater latitude of the chest, & of course the greater freedom of pulmonary circulation at that period. If we watch the growth of the human body, it will be seen that in youth it advances rapidly upward without a ~~corresponding dilat~~ proportionate dilatation in breadth until about the 20th year when it has attained its maximum of height From this period, however, the chest & trunk continue to dilate, so that a man can seldom be found, whose thorax is not wider at 50 years, than it was at 20. This circumstance must contribute not a little to the comparative immunity of elderly life from pulmonary consumption. —

Phthisis pulmonalis has sometimes been placed among those diseases, which are not within the control of Medicine.

Quem semel invasi, vix a viventi recedunt.

The causes which render the advanced state of phthisis so often incurable do not depend so much on any thing specific in the ulceration, as on the combination of circumstances which exist at that period. If we imagine an extensive ulcer continually exposed to the action of the atmosphere, incapable of surgical applications, having its edges alternately approximated and retracted with every act of respiration, & frequently agitated thro its whole extent with convulsive violence; to such an ulcer we could hardly give a favorable prognosis in any part of the body. To this we must add the febrile state of the system, the increased action of the pulmonary veſsels with an obstructed and difficult circulation. Tubercles, abſceſses &c. neceſsarily interrupt the course of many veſsels whose blood is thrown upon the remaining ones, creating additional distention & irritation.

In the treatment of phthisis, the state of the system, but particularly of the lungs require a diminution of the quantity of blood especially in the pulmonary veſsels. The advantages of venesection are obvious and well

attested by experience. On the frequent use of this depends the principal hope of cure, so long, as it is indicated by an increased activity of the pulse. The fullneſs of the pulse is not so much to be regarded, since in this disease the blood accumulates in the right side of the heart & in the veins producing venous plethora, while the arteries contain no more blood than escapes thro the obstructed lungs. This remark is justified by observing the distention which takes place in the veins of phthisical persons, particularly on a full inspiration.

When the system is too far prostrated to admit of farther evacuations, the lungs may still be relieved in a degree from their oppreſsion, by a revulsion or determination of the blood to other parts of the body. This is accomplished by blisters, rubefacients, pediluvium, ligatures &c. While however we diminish the quantity of blood in the lungs, we at the same time diminish the oxygenation of the blood, already too incomplete. Hence the propriety of allowing the patient a pure & highly oxygenated atmosphere, & the impropriety of his respiring reduced, impure & modified gases.

As the object of this eſsay has been only the partial consideration of the disease with a particular view to the pulmonary veſsels; the remaining modes of treatment proper for the inflammatory, the hectic & typhus ſtates are omitted. The remarks already made are submitted with diffidence to the inspection of superior discernment and erudition. They are the conclusions of inexperience, which a greater maturity of observation may induce me to relinquish. A desire of avoiding as far as poſsible an unneceſsary repetition of the opinions of others has prevented a more general view of the subject. It has *not* been intended to give a theory of pulmonary consumption. The observations made can only be considered as appendages to the pathology of a disease, whose nature is so well explained by the enlightened system of medicine taught in this university

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